WHAT IS CLAIMED IS:

1. An integrally cast steel piston for internal engines.

2. The internal engine piston according to claim 1, whose head portion, pin boss portion and skirt portion are integrally cast.

3. The internal engine piston according to claim 2, wherein it further comprises a cooling hollow portion, which is formed by integral casting.

4. The internal engine piston according to claim 3, wherein it is a diesel engine piston comprising a combustion chamber in a head portion, and wherein it further comprises a cooling hollow portion, which is formed near said combustion chamber by integral casting.

5. An integrally cast steel piston for internal engines, said cast steel having a composition comprising, by mass, 0.8% or less of C, 3% or less of Si, 3% or less of Mn, 0.2% or less of S, 3% or less of Ni, 6% or less of Cr, 6% or less of Cu, and 0.01-3% of Nb, the balance being substantially Fe and inevitable impurities.

6. The internal engine piston according to claim 5, wherein said cast steel has a composition comprising, by mass, 0.1-0.55% of C, 0.2-2% of Si, 0.3-3% of Mn, more than 0.005% and 0.2% or less of S, 1% or less of Ni, 3% or less of Cr, 1-4% of Cu, and 0.1-3% of Nb, the balance being substantially Fe and inevitable impurities.

7. An integrally cast steel piston for internal engines, said cast steel having a composition comprising, by mass, 0.1-0.8% of C, 3% or less of Si, 3% or less of Mn, 0.2% or less of S, 10% or less of Ni, 30% or less of Cr, 6% or less of Cu, and 0.05-8% of Nb, the balance being substantially Fe and inevitable impurities.

8. The internal engine piston according to claim 7, wherein said cast steel has a composition comprising, by mass, 0.1-0.55% of C, 0.2-2% of Si, 0.3-3% of Mn, 0.05-0.2% of S, 0.5-6% of Ni, 6-20% of Cr, 1-4% of Cu, and 0.2-5% of

Nb, the balance being substantially Fe and inevitable impurities.

9. The internal engine piston according to claim 7 or 8, wherein said cast steel comprises C, Ni and Nb in a range of $0.05 < (C\% + 0.15\ Ni\% - 0.12\ Nb\%) \leq 0.8$ by mass.

10. The internal engine piston according to any one of claims 7-9, wherein said cast steel has a matrix microstructure, less than 30% of which is an austenite phase.

11. The internal engine piston according to any one of claims 5-10, wherein said cast steel further comprises 0.5% by mass or less of V and/or Ti.

12. The internal engine piston according to any one of claims 5-11, wherein said cast steel further comprises at least one of Al, Mg and Ca in an amount of 0.04% by mass or less.

13. An integrally cast steel piston for internal engines, said cast steel having a microstructure having eutectic carbides at an area ratio of 1-35%, said eutectic carbides forming eutectic colonies, which are assemblies of eutectic carbides and said matrix phase.

14. The internal engine piston according to claim 13, wherein said eutectic carbides have an average equivalent-circle diameter of 3 μm or less.

15. The internal engine piston according to claim 13 or 14, wherein the number of eutectic colonies each having an area of 50 μm^2 or more is 10 or more in a 1-mm^2-cross section of the microstructure.

16. The internal engine piston according to any one of claims 13-15, wherein said eutectic carbides include Nb carbides.

17. An integrally cast steel piston for internal engines, wherein an area ratio of sulfides is 0.2-3.0% in a cast steel microstructure, and wherein a ratio of the number of sulfides each having a circularity of 0.7 or more to the total number of sulfides is 70% or more.

18. The internal engine piston according to claim 17, wherein said sulfide

contains Mn and/or Cr.

19. The internal engine piston according to any one of claims 5-18, wherein said cast steel has a 0.2-% yield strength of 350 MPa or more and a Young's modulus of 140 GPa or more in a range of 350°C to 500°C, and an average linear thermal expansion coefficient of 10-16 x 10^{-6}/°C between room temperature and 500°C.

20. A method for producing the internal engine piston recited in claim 5 or 6, comprising casting said steel, holding it at 850°C or higher, and then air-cooling it.

21. The method for producing an internal engine piston according to any one of claims 7-10, wherein said cast steel is cast, held at 450°C or higher, and then air-cooled.

22. The method for producing an internal engine piston according to claim 21, wherein said cast steel is held at 1000°C or higher after casting, rapidly cooled, held at 450°C or higher, and then air-cooled.